

PATENT SPECIFICATION

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661,978



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Complete Specification Published: Nov. 28, 1951.

Index at acceptance:—Classes 83(ii), A49; and 83(iv), R(2: 10).

COMPLETE SPECIFICATION

Improvements relating to Spot-Weld Electrodes

We, THE ROVER COMPANY LIMITED, a British Company, of Meteor Works, Lode Lane, Solihull, Birmingham, do hereby declare the invention, for which we pray

5 that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a water-cooled, 10 copper-alloy electrode having a working end of the requisite hardness for use in spot-welding aluminium and like light alloy members.

The nature of the invention will be 15 described with reference to the accompanying drawings, in which:—

Figure 1 is an elevation of a water-cooled, copper-alloy electrode, as previously known, when it is due to be 20 scrapped, the chain line 10 indicating the original tip of the working end;

Figure 2 is an elevation of an electrode reclaimed according to the invention, with the working end shown partly in section;

25 Figure 3 is an elevation of the working end alone; and

Figure 4 is an elevation of a cranked electrode without the working end, and 30 to which the working end of Figure 3 could be soldered to complete it.

Like reference numerals are used throughout the various figures to denote similar parts.

35 Certain difficulties are encountered in spot-welding light alloy members owing to the tendency of the electrode to adhere to or "pick up" the light alloy, and the practice in the past has been to re-cone 40 or otherwise "dress" the working end 12 of the electrode after a relatively few welds, for example, 400 welds, in order to ensure continued satisfactory operation. In general, however, after the electrode 45 has been re-coned or otherwise "dressed," say, three times, it has shrunk to the size shown by Figure 1, in

which case it is no longer possible to "dress" it for further use and it has to be discarded. In consequence, the relatively few welds obtainable, perhaps only a matter of 1200 for each electrode, have militated against the commercial spot-welding of light alloy members.

The main object of the present invention is to avoid this disadvantage in a very simple manner.

The invention consists in a method of re-claiming an electrode as first-mentioned, e.g. as shown by Figure 1, when it is no longer possible to "dress" it for further use, this method involving severing the working end from the main portion or shank of the electrode through the adjacent end of the water passage 15 (as 65 by unsoldering the spigot joint if the electrode has one), machining a spigot, such as the spigot 16, on the severed end of the shank if there is no such spigot already in existence, using a new working end (Figure 3) having the requisite hardness and having a mating spigot (for example, as provided by the recess 17) for that of the shank, and soldering together the new working end and shank 75 in spigot engagement without allowing the heat to travel sufficiently to reduce the hardness of the tip.

In practice the shank usually has at its end remote from the tip a Morse taper portion 19 to enable it to be supported in a known manner, and the heat of soldering should likewise not be allowed to travel sufficiently towards that end to reduce the hardness of the taper portion— 80 but that is unlikely to present any difficulty inasmuch as the taper portion is well spaced from the joint, usually by a cylindrical portion 20 (or equivalent portion 20a in the case of a cranked electrode 85 —Figure 4) having spanner-engaging flats 21 formed on it. The water-cooling passage 15 usually consists of a plain bore machined axially from the shank end of

the electrode towards, but not of course as far as, the tip of the working end 12.

Thus, when an ordinary one piece or solid electrode (Figure 1) can no longer be "dressed," the working end should be severed from the rest of the electrode at the inner end of the water passage, i.e., along the chain line 23, and the severed end of the shank can then have an external recess turned on it to leave the spigot 16 to be received within a corresponding internal recess 17 of a new working end having the requisite hardness, the new working end having formed in it 24 axially beyond this recess the extremity 24 of the water passage.

A preferred method of soldering involves using "Tinmans" solder and then resistance-heating the parts in an appropriate machine, which takes approximately four to seven seconds, a time which is insufficient for the heat to the hardness of the tip, or, of course, the hardness of the taper portion of the shank. Alternatively, whilst using this solder, soldering can be effected by normal hand methods, or solders of silver or easy-flow types can alternatively be used, care being taken that the heat travel does not 30 reduce the hardness figure of the parent metal either at the tip or in the taper portion.

By means of the invention the cost of the electrodes used for a given number of spot-welds is very considerably reduced. Obviously the re-claimed electrode can be "dressed" after a certain number of welds in a normal manner. Only when it can no longer be "dressed" for further use is it necessary to melt the solder and remove the working end, or otherwise remove the working end, then again providing a new working end as aforesaid.

What we claim is:—

A method of re-claiming a water-cooled, copper-alloy, spot-weld electrode which involves the steps of severing the working end from the main portion or shank of the electrode through the adjacent end of the water passage, machining a spigot on the severed end of the shank if there is no such spigot already in existence, using a new working end having a requisite hardness and having a mating spigot for that of the shank, and soldering together the new working end and shank in spigot engagement without allowing the head to travel sufficiently to reduce the hardness of the tip.

Dated this 8th day of February, 1950.
WALFORD & HARDMAN BROWN,
Chartered Patent Agents,
Roslyn Chambers, 47, Warwick Road,
Coventry, Warwickshire.

PROVISIONAL SPECIFICATION

Improvements relating to Spot-Weld Electrodes

60 We, THE ROVER COMPANY LIMITED, a British Company, of Meteor Works, Lode Lane, Solihull, Birmingham, do hereby declare this invention to be described in the following statement:—

65 This invention relates to a water-cooled, copper alloy electrode having a tip of the requisite hardness for use in spot-welding aluminium and like light alloy members.

70 Certain difficulties are encountered in spot-welding light alloy members owing to the tendency of the electrode to adhere to or "pick up" the light alloy, and the practice in the past has been to re-cone or

75 otherwise "dress" the working end of the tip of the electrode after a relatively few welds, for example, 400 welds, in order to ensure continued satisfactory operation. In general, however, after the

80 electrode has been re-coned or otherwise "dressed," say, three times, it is no longer possible to "dress" it for further use and it has to be discarded. In consequence the relatively few welds obtainable, perhaps only a matter of 1200 for

each electrode, have militated against the commercial spot-welding of light alloy members.

The main object of the present invention is to avoid this disadvantage in a very simple manner.

The invention broadly consists in an electrode as aforesaid having a spigot joint through the end of the water-cooling passage adjacent the tip, the parts being soldered together at the joint.

According to a further feature of the invention, a method of re-claiming an electrode as first mentioned, when it is no longer possible to "dress" it for further use, involves severing the tip end from the rest of the electrode through the adjacent end of the water passage (as by unsoldering the spigot joint in the case of the electrode of the preceding paragraph), machining a spigot on the severed end of the main portion or shank of the electrode if there is no such spigot already in existence (as there would be in the case of the electrode of the preceding paragraph), using a new tip having the requi-

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site hardness and having a mating spigot for that of the shank, and soldering together the new tip and shank in spigotal engagement without allowing the heat to travel sufficiently to reduce the hardness of the tip.

In practice the shank usually has at its end remote from the tip a morse taper portion to enable it to be supported in a known manner, and the heat of soldering should likewise not be allowed to travel sufficiently towards that end to reduce the hardness of the taper portion—but that is unlikely to present any difficulty inasmuch as the taper portion is well spaced from the joint, usually by a cylindrical portion having spanner-engaging flats formed on it. The water-cooling passage usually consists of a plain bore machined axially from the shank end of the electrode towards, but not of course as far as, the tip.

Thus, when an ordinary one piece or solid electrode can no longer be "dressed" the tip end should be severed from the rest of the electrode at the inner end of the water passage, and the severed end of the shank can then have an external recess turned on it to leave a spigot to be received within a corresponding internal recess of a new tip having the requisite hardness, the new tip having formed in it axially beyond this

recess the extremity of the water passage.

A preferred method of soldering 35 involves using "Tinmans" solder and then resistance-welding the parts in an appropriate machine, which takes approximately four to seven seconds, a time which is insufficient for the heat to 40 destroy the hardness of the tip, or, of course, the hardness of the taper portion of the shank. Alternatively, whilst using this solder, soldering can be effected by normal hand methods, or 45 solders of silver or easy-flow types can alternatively be used, care being taken that the heat travel does not reduce the hardness figure of the parent metal either at the tip or in the taper portion. 50

By means of the invention the cost of the electrodes used for a given number of spot-welds is very considerably reduced. Obviously the re-claimed electrode can be "dressed" after a certain number of 55 welds in a normal manner. Only when it can no longer be "dressed" for further use is it necessary to melt the solder and remove the tip, or otherwise remove the tip, then again providing a new tip as 60 aforesaid.

Dated this 4th day of March, 1949.
WALFORD & HARDMAN BROWN,
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Roslyn Chambers, 47, Warwick Road,
Coventry, Warwickshire.

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copies, price 2s. per copy; by post 2s. 1d. may be obtained.

ERRATA

SPECIFICATION No. 661,978.

Page 2, line 22, after "to" insert
"destroy"
Page 2, line 58, for "head" read
"heat"

THE PATENT OFFICE,
28th April, 1952.

This Drawing is a reproduction of the Original on a reduced scale

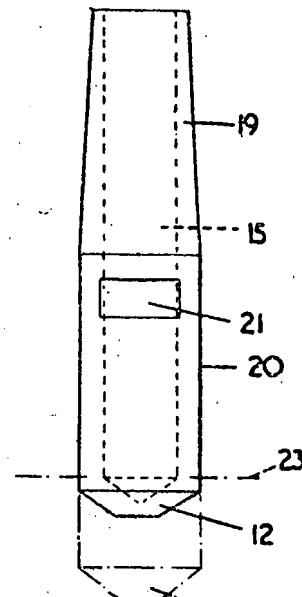


FIG. 1

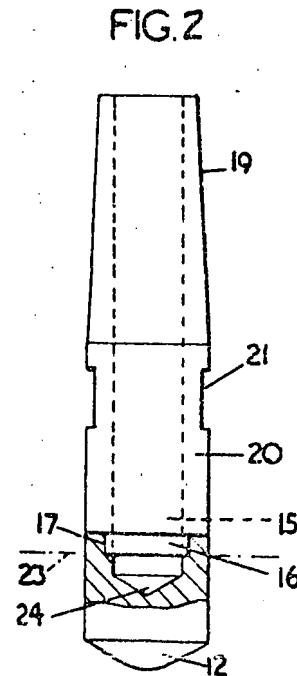


FIG. 2

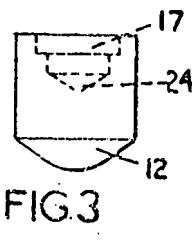


FIG. 3

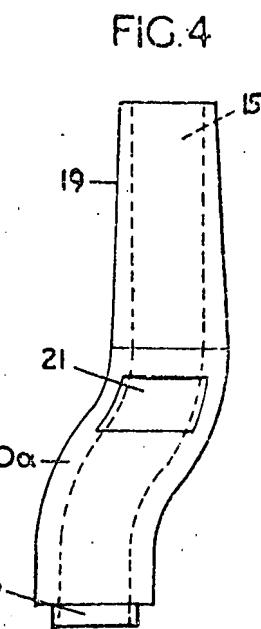


FIG. 4